

Continued Development of Compact Multi-gas Monitor for Life Support Systems Control in Space

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Miniature optic gas sensors (MOGS) based on luminescent materials have shown great potential as alternatives to Near-Infrared-based gas sensor systems for the advanced space suit portable life support system (PLSS). The unique capability of MOGS for carbon dioxide and oxygen monitoring under wet conditions has been reported, as has the fast recovery of MOGS humidity sensors after long periods of being wet. Lower volume and power requirements are also potential advantages of MOGS over both traditional and advanced Non-Dispersive Infrared (NDIR) gas sensors, which have shown so far longer life than luminescent sensors. This paper presents the most recent results in the development and analytical validation of a compact multi-gas sensor unit based on luminescent sensors for the PLSS. Results of extensive testing are presented, including studies conducted at Intelligent Optical Systems laboratories, a United Technology Corporation Aerospace Systems (UTAS) laboratory, and a Johnson Space Center laboratory. The potential of this sensor technology for gas monitoring in PLSSs and other life support systems and the advantages and limitations found through detailed sensor validation are discussed.

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